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ABSTRACT

Membership in the Computer-Based Message Switching (CBMS) network increased to 33 agencies and organizations as a result of project work to establish an electronic communication system for vocational education program improvement. The project was funded by the Office of Vocational and Adult Education under the Applied Research and Development Function of the National Center for Research in Vocational Education. Membership in the CBMS now includes all 6 regional curriculum coordination centers, 3 national organizations, and 24 state educational agencies. During the initial year of operation, approximately 220 messages were exchanged each month by network members. Uses included transmittal of routine messages, requests for information or resources, responses to requests, transmittal of product distribution information, announcement of new products, tracking of projects and products, announcements of meetings, and news about conference events. Cost for each of the monthly messages (assuming five minutes each for messages totaling 1,100 minutes per month) was approximately $2, or $440 per month. Telephone messages (at $5 each) would total $1,100, while letters (at $7 each) would total $1,540. Therefore, the CBMS network will provide substantial savings for users, even when the National Center for Research in Vocational Education stops funding it and users have to pay the estimated cost of $200 per year. (KC)

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COMMUNICATION LINKAGE IMPLEMENTATION STUDY: A Computer Based Message System for Vocational Education

FINAL REPORT

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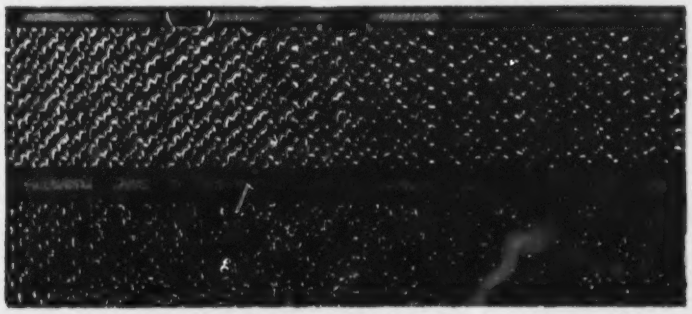

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- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Providing information for national planning and policy
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

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FOREWORD

When properly utilized, computer-based message switching (CBMS) offers a more economical and effective means of communicating short messages, requests, responses, and news items than conventional use of the telephone or mail. Using computer terminals to access a central computer via telephone lines one can compose, store, and retrieve messages regardless of the availability of the receiving party and the time zone differences that exist between the eastern and western reaches of the nation. The establishment of a CBMS network is the focus of a designated study under the Applied Research and Development Function of the National Center for Research in Vocational Education. This report is intended as a planning document for use by the National Center and the Office of Adult and Vocational Education staff to guide and integrate this technology with vocational education program improvement agencies. The purpose of this message system is to provide an effective communication link between the research coordinating units in state education agencies, regional curriculum coordination centers, the Office of Vocational and Adult Education, the National Center, and others. In this manner, the feasibility of using CBMS systems to link education agencies was tested and demonstrated.

The participation by the 33 agencies and organizations which now belong to the network is facilitating faster progress on mutual program improvement goals. Project staff gratefully acknowledge the cooperation of the Office of Vocational and Adult Education, the National Network for Curriculum Coordination in Vocational-Technical Education, the National Research Coordinating Unit Association, the National Association of State Directors of Vocational Education, and the American Vocational Association. We appreciate the time and assistance of the technical reviewers: David Colombo, OCLC, Inc.; Rebecca Douglass, East Central Curriculum Coordination Center; Ken Gabbert, Arizona Research Coordinating Unit; and Murray Johnston, CompuServe, Inc. Recognition is given to the Information Systems Division staff members for their efforts on this study: Carl F. Oldsen, Project Director, has a degree in Library and Information Science from Vanderbilt University, and has 15 years experience in the design, implementation, and operation of information systems and services; Catherine Smith, typist; and Janet Ray, word processing operator.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

Membership in the Computer-Based Message Switching (CBMS) network increased to thirty-three agencies and organizations as a result of project work to establish an electronic communication system for vocational education program improvement. This accomplishment occurred during the second year of a two-year study designated by the Office of Vocational and Adult Education under the National Center's Applied Research and Development Function. Membership in the CBMS now includes all six regional curriculum coordination centers, three national organizations, and twenty-four state education agencies (i.e., research coordinating units, state liaison representatives, or state resource centers).

During the initial year of operation, approximately 220 messages were exchanged each month by network members. Uses included transmittal of routine messages, requests for information or resources, response to requests, transmittal of product distribution information, announcement of new products, tracking of federal- and state-administered projects and products, preparation of conference agendas, announcement of meetings, registration for conferences, and news about conference events. CBMS computer terminals may also be used to access information available through commercial database vendors. As microcomputers become more widely used by member agencies and organizations, other applications of CBMS may be possible. In addition, it should be possible to use this technology for bulletin board and newsletter broadcasting applications.

CBMS can be used to illustrate concrete cost savings when we examine data that shows an average usage of 1,100 minutes per month. Assuming that the average message takes 5 minutes--that is, 220 messages per month--costs for each of the three following methods are:

CBMS	Telephone	Letter
$2.00 per message	$5.00 per message	$7.00 per message
$440 total	$1,100 total	$1,540 total

CBMS savings are $660 and $1,100, respectively, over the two alternative delivery systems and will vary on usage by particular users.

The National Center will continue to provide technical assistance in the use of CBMS and to promote its use. The true value of CBMS will be measured by usage now that costs will be borne by the individual members. Given an estimated cost of $200 per year, savings from its use should still be realized.

INTRODUCTION

The National Center for Research in Vocational Education was asked by the Office of Vocational and Adult Education (OVAE), U.S. Department of Education, to continue for a second year a designated research and development project to develop and implement an electronic communication network for vocational education program improvement. During this second year, the computer-based message switching (CBMS) system achieved full operation and involved thirty-three agencies in its membership and use of state-of-the-art telecommunications technology. This final report contains the results of this year of operation and presents findings and recommendations for future efforts.

BACKGROUND

Traditionally, the regular and routine exchange of information among vocational education agencies at state, regional, and national levels has been by telephone, letter, and face-to-face meetings. Timeliness and cost have been a problem with these modes. However, recent advances in telecommunications technology make it possible for vocational education program improvement agencies to communicate faster and more effectively and at a lower cost than with the traditional modes. This new capability allows users to capitalize on the exchange of information nationwide, yielding lower-cost responses to requests for information and higher returns on research and program investments.

During the second year of this designated study, the National Center began operation with the CBMS technology that was selected during the first year activities. A continuing review of the literature has shown CBMS (also called electronic mail) to be a fast growing and useful communications system for corporate, educational, and research-related firms. Other examples of this technology include (E-COM) from the U.S. Postal Service, Source Mail from Source Telecomputing Corporation, Infoplex from CompuServe, Dialcom from ITT, Telemail from GTE, Electronic Information Exchange System (EIES), and EDUCOM's Mailnet. The entry of these and other delivery systems into the communication market has been largely in response to a growing need for this unique and valuable service. The growth of CBMS in vocational education during this past year is an additional example of the viability of the service. CBMS has served to bring member agencies and organizations into closer contact to share needs and resources, bring about increased productivity, and incorporate the latest technology to assist in solving problems of information transfer and dissemination.

The applications of CBMS have increased and diversified during this second year to include confirmation of meeting dates and agenda preparation, announcement of new products and their availability, placement of orders for products, obtaining product distribution information from research coordinating units (RCUs) and state liaison representatives (SLRs), and announcement of new members to the network. These applications are in addition to those incorporated during the first year of operation. These were responding to requests for curriculum availability, providing response information on searches of databases, and tracking the receipt of federal- and state-administered projects and product descriptions.

Bibliographic Retrieval Service (BRS) continues to be the vendor despite the entry of new firms into the field. The role of BRS as vendor was continued by virtue of its familiarity with the education marketplace and its lower cost. Furthermore, its system is easy to learn and use and is already established among current CBMS members.

APPROACH TAKEN

A major objective of the study in the second year was to increase the use of CBMS among core members and add new members throughout the course of the year. From the initial membership of four at the beginning of the second year, membership increased steadily to thirty-three as of December 15, 1982 (see chart 1 for a list of members). As membership increased, the incentive to join increased because of the increased opportunity to communicate and obtain service. As agencies and organizations came into the system, the National Center was able to send messages inquiring about the receipt of acquisitions information, responding to information requests of the National Center Clearinghouse databases, providing technical assistance in the use of terminals or microcomputers at users' access points, and providing data on terminal (T-number) addresses. These messages, in turn, served to encourage familiarity with CBMS and to increase its usefulness to the participants. (See table 1 for a listing of monthly usage by current network members.

The quality of messages sent and received was enhanced when the Resources in Vocational Education (RIVE) database--also called the Program Improvement database--became a public file with BRS on March 1, 1982. Public file status allowed access to RIVE data on a royalty-free basis by anyone possessing a BRS password. In this regard, CBMS was used to announce the availability of the database, respond to requests for information on RIVE, display dates for training in the system, and ascertain attendance at scheduled training meetings.

Parallel to the RIVE effort, the Vocational Education Curriculum Materials (VECM) database became available in a field test version in March 1982. Availability of this database provided additional impetus for increased searching activities, along with the occasion to use CBMS to announce its availability, schedule training, and announce password clearances to access the file.

National Center personnel provided CBMS service at the annual meeting of vocational education state directors meeting in West Virginia in September 1982. This effort was very effective in promoting membership, as indicated by membership increases announced by the vendor in the weeks following the meeting. Specifically, CBMS was used to confirm list of attendees and to request and submit agenda items. An on-site terminal was available for attendees to maintain contact with their offices. It also provided the opportunity for Dr. Robert Worthington, of OVAE, to send messages to those already on the system and to encourage participation. In addition to the state directors' meeting, other CBMS applications and uses were (1) to allow the Dissemination and Utilization Program at the National Center to provide availability information on selected products and to solicit program topics for the Fifth Annual Nationwide Vocational Education Dissemination Conference, (2) to permit the National Academy for Vocational Education at the National Center to announce

CHART 1

MESSAGE SWITCHING DIRECTORY

CURRICULUM COORDINATION CENTERS	"T" Number
East Central CCC	T96G
Midwest CCC	T5U9
Northeast CCC	T57U
Northwest CCC	T5VØ
Southeast CCC	TDXH
Western CCC	T3B9

RESEARCH COORDINATING UNITS AND STATE LIAISON REPRESENTATIVES	
Alabama RCU	T9S3
Arizona SLR	T3E1
Arkansas SLR	T7A3
California RCU VOICE	T74Y
Florida RCU	TDWI
Idaho RCU	TDWJ
Indiana RCU	T8Z3
Kansas Department of Education	T7R7
Louisiana RCU	T6X4
Massachusetts Vocational Resource Center	TV97
Michigan RCU	TDX4
Nebraska SLR	TEBD
Nevada RCU	T8D8
New Mexico RCU	T7Z2
North Carolina RCU	T9S6

CHART 1--continued

RESEARCH COORDINATING UNITS AND STATE LIAISON REPRESENTATIVES (continued)	
North Dakota SLR	TDXI
Ohio SLR	TEDA
Oregon RCU	T5F6
Pennsylvania RCU	T6P3
South Carolina RCU	TEC1
Texas RCU	TEC7
West Virginia RCU	T4U3
Wisconsin SLR	TEDD
Wyoming RCU	TD9A
NATIONAL ORGANIZATIONS	
American Vocational Association	TA31
National Association of State Directors of Vocational Education	TECZ
National Center for Research in Vocational Education	TB8Ø

TABLE 1

MESSAGE SWITCHING USAGE--1982
(In Minutes)

CENTER	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
East Central CCC	--	157	90	77	85	126	125	78			738
Midwest CCC	90	69	108	56	90	80	90	43			626
National Center	180	303	269	191	246	575	219	253			2236
Northeast CCC	35	253	233	49	91	22	24	32			739
Northwestern CCC	20	89	129	40	4	92	107	139			620
Western CCC	60	148	130	60	118	104	101	130			851
Alabama RCU						21					21
Arizona RCU	30	33	56	39	75	94	52	47			426
Calif. RCU-VOICE	45	139	93	61	149	124	200	143			954
Florida RCU						16	40	50			106
Idaho RCU						50	45	66			161
Indiana RCU				30	113	53	42	8			246
Mass. Voc. Res. Ctr.	50	66	44	70	44	26	40	19			359
Michigan RCU					90	27	50	21			188
NASDVE								105			105
Nebraska RCU					2	26	10	2			40
North Dakota SLR						39	13	38			90
Oregon RCU	5	18	27	62	47	28	9	7			203
West Virginia RCU	5	15	7	--	7	5	4	5			48
Monthly Total	520	1290	1186	735	1161	1508	1171	1186			8757

NOTE: Figures are expressed in minutes of usage; assume that an average message takes five minutes to enter and sent.

Agencies not listed do not have access to terminals at this time.

Latest available operating data available as of January 15, 1983.

conferences and workshops and to "pre-register" attendees, and (3) to enable the National Center Publications Office to obtain product distribution information from state liaison representatives and to announce the avai'ability of new products.

Demonstrations of CBMS were conducted by a BRS representative at the National Research Coordinating Unit Association conference in Las Vegas and the concurrent National Network for Curriculum Coordination in Vocational and Technical Education meeting in Seattle.

The American Vocational Association (AVA) and the National Association of State Directors of Vocational Education (NASDVE) consortium joined the network in September 1982. NASCVE has included CBMS as an integral part of its program scope of work for the coming year on the basis of the benefits and demonstrated usefulness of CBMS to its program efforts.

Usage statistics were provided by BRS on a monthly basis; these were keyed to the passwords issued to each participating agency. The National Center supported this operation throughout the year by means of a budget line to pay for CBMS operations during the initial operational phase. Monthly invoices showed individual and overall totals as reflected in table 1, p. 8. Usage data from April through November illustrate variations due to the increase in the number of terminals, conference presentations, and seasonal vacation periods. Total membership was as follows:

- o February 1982--14 members
- o July 1982--25 members
- o October 1982--32 members
- o December 1982--33 members

CONCLUSIONS

Costs to support message switching from February through November 1982 were approximately $440 per month. Approximately 220 messages (with an average length estimated at 5 minutes) were sent between members each month at a cost of $2.00 each--well below the average of a letter at $7.00 or telephone call at $5.00. CBMS is clearly a cost-effective way to transmit brief and succinct messages that is unaffected by differences in time zones and not dependent on the recipient being in the office and available. Further, CBMS allows same-day delivery and provides copies to both sender and recipient.

Message switching activity for the period April 1 through November 30, 1982, totaled 8,757 minutes (just under 146 hours) for the twenty members that had terminals and were using the system at that time. The largest user was the National Center, accounting for 25 percent of total usage, with the curriculum coordination centers (CCCs) being the next largest user group. (See table 2 for a complete listing of usage times by agency and month.

CBMS has been employed in a variety of ways during this past year. These include the following:

- Requesting additional information or searches of National Center developed databases, succ as RIVE, VECM, and Resource Organizations and Meetings for Educators (ROME)
- Handling queries on the availability of materials in the military curriculum library
- Obtaining sales data and orders for cost-recovery materials from SLRs and RCUs
- Confirming meeting dates and conference call times, agenda item solicitation, and materials receipt
- Announcing new products available through the National Center's Publications Office and Dissemination and Utilization Program's (D&U) product selections
- Providing status reports on the number of VECM report forms being sent from CCCs in order to schedule database updates and data-entry work loads
- Offering inter-center loans of curriculum materials outside one's own region in hardcopy or microfiche

- o Serving as an information conduit from OVAE to network members on new and emerging programs, priorities, appropriations, and obligations

- o Providing updates of terminal numbers, usage statistics, and technical assistance and demonstrating usage of the system

The adoption of CBMS by agencies during this second year was hastened by the decision to support the cost of the activity for network members. This allowed all agencies to begin use as soon as they had access to a computer or microcomputer terminal. Membership in the School Practices Information Network (SPIN) was necessary to receive the lowest per hourly rate ($18) to access the message switching (MSGS) database. For this reason, active participation in the network always lagged behind total membership as agencies required time to receive or gain access to a terminal. This did provide the impetus for greater articulation among agencies as several entered into cooperative agreements to use a common terminal and password. Other delays of two to three weeks were common as the vendor had to process the membership applications and enter the respective passwords and terminal numbers into the BRS computer system. This delay in use was compounded by the fact that each agency had two passwords, one beginning with ESX, and the other with ESG. The former (ESX) was for message switching use exclusively, which the National Center supported, and the latter (ESG) allowed for searching on related databases at the member's own expense. This duality of service was beneficial in that all agencies could do the majority if not all searching through the CBMS vendor, thus using their terminal for multiple uses in additional to message switching, which subsequently amortized the cost.

OBSERVATIONS AND RECOMMENDATIONS

Computer-based message switching has found a place within the total communication needs of vocational education program improvement agencies. This study has shown that new developments in computer and telecommunications technology can be incorporated as a regular part of an organization's business routine. The increasing availability of computer and microcomputer terminals provides the hardware to access these CBMS systems, and the necessary software is readily available, as is evidenced by the number of firms entering the CBMS or electronic mail market.

The project staff members developed four key recommendations that represent what has been learned from this effort.

1. The National Center should continue to provide technical assistance and support to facilitate the use of CBMS and to increase membership by program improvement agencies.

2. The National Center will continue to encourage full participation in the use of CBMS by all RCUs, SLRs, and state departments of vocational education to maximize the effectiveness of telecommunications through CBMS.

3. The National Center should work with NASDVE to bring about closer usage of CBMS in relation to its professional development efforts and to encourage in other special networks to use CBMS (e.g., the National Center's National Postsecondary Alliance). The CBMS effort begun in 1982 provides a solid linkage between vocational education and postsecondary programs. This in turn is linked to the School Practices Information Network (SPIN) of BRS, which provides electronic access to over 240 educational agencies.

4. A videotex application, which is the implementation of an electronic newsletter or bulletin board via CBMS, should be initiated in 1983. This is an enhancement that allows agencies to add news items electronically via their terminal for display to all members. It is "menu-driven," meaning that the subject of each paragraph is highlighted in a separate listing for quick review by the user. Connected with each subject is a paragraph number that, when displayed, provides the text of the article. It permits an electronic version of the process of browsing through a table of contents or highlights in a traditional, printed publication.

ADDITIONAL FINDINGS

The impetus to CBMS activity provided by the National Center in terms of leadership and technical assistance will continue, but fiscal support will be borne by the network participants in the coming year. Using the average costs as a basis this should be less than $200 per members and appears to be reasonable.

Several technical enhancements that would facilitate system use have been communicated to the vendor, including (1) use of aggregate (broadcast) terminal addresses (i.e., a single number that can represent entire groups, CCCs, RCUs, SLRs, etc. so that separate addresses would not have to be entered for each one); (2) expanded capacity of each message from 100 words to 500 words for transmitting more text material; and (3) automatic re-entry between messages rather than a separate log-on procedure between each message. These efforts, coupled with an increased membership across all states, adjunct information centers, related educational networks, and associations, will allow CBMS benefits to accrue to all in vocational education.